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A Review of *Preserving the Environment: New Strategies for Behavior Change,* Edited by Geller, Winett, & Everett[1]

Edwin P. Willems and Jeanne D. McIntire
University of Houston Central Campus

With the exception of major wars, few issues in recent public life have gripped the people of the world like the problem of energy. Petropower is the means by which relatively underdeveloped and backward countries muscle up for their places in the sun, often abruptly. Industrialized and developed countries experience vulnerability and a sense of imminent decline as well as a frustrating dependence on the very countries who are using energy to supplant them. And yet, the distribution and availability of energy is but one of the serious problems of the environment. Common sense, conventional social wisdom, and some elements of theory in behavioral science all suggest that human behavior is implicated in the emergence of environmental problems, and it would follow that focusing on behavior would be one way to redress them. *Preserving the Environment* summarizes behavioral approaches to the environment and spells out the implications of those approaches. The authors argue that much can be done to improve environmental quality through the systematic use of applied behavior analysis. In fact, as Becker (1981) pointed out in his review of a similar book, the authors' "orientation combines environmentalist concerns with ecology with a Republican belief in the efficacy of individual effort stimulated by direct, often monetary, benefits" (pp. 516-517).

In what follows, we shall describe *Preserving the Environment,* comment on some of its major strengths and weaknesses, note the extent to which the authors achieve their purpose, and evaluate the book's contributions in the light of some larger, contextual issues. To anticipate our conclusion, this is a timely, strong, and important book, although it has some important limitations. We view our criticisms as issues that should be kept in mind while reading the book and not as reasons to pass it up.

SUMMARY

Arguing for the potential of behavioral technology to alleviate environmental problems and acknowledging that psychology's attending to those problems is unique, the authors have gathered over 150 recent studies to demonstrate the central role that behavioral science can and must occupy. It is even suggested that the tradition of using physical technology without behavioral considerations has contributed to current environmental problems. The book can be divided into three parts: (a) the contextual-theoretical perspective on behavior patterns and behavioral principles in relation to their implementation in behavior change programs; (b) behavioral research in five major categories of environmental problems; and (c) future expectations, trends in conceptualization, and the role of behavioral scientists as change agents.

Chapter 1 uses scenarios described in behavioral terms to summarize the authors' view of people making a difference in preserving or degrading the environment. When behavioral procedures elicit a change in the individual, the authors refer to "first order change." Behavior change affecting larger social units is "second order or third order change." Although people through their life styles create negative impact on the environment, the authors caution against "blaming the victim" because although focus on the individual has been convenient, the brunt of responsibility for many

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environmental problems may lie with policy makers and larger systems. The authors prefer conservation (low technology) over highly technical solutions, and they argue that conservation and positive environmental impact should be possible without compromising standards of living or threatening the economy.

Chapter 2 presents the logic and rationale for the authors' approach, which is based in applied behavior analysis. Much of the material will have a familiar ring to the experienced reader, but will leave most laypersons confused. The presentation focuses on a taxonomy of target behaviors and a taxonomy of available change strategies. The latter fall into the familiar categories of antecedent and consequence approaches. One useful addition to traditional discussions is the distinction between consequences that are response contingent (e.g., reinforcement for lowering a thermostat) vs. those that are outcome contingent (e.g., reinforcement for achieving a $5-per-week reduction in consumption of electricity). A detailed discussion of behavioral principles (including schedules of reinforcement) is followed by two central issues: the importance of strong, interpretable data for evaluating interventions (including the logic of reversal designs) and the kinds of compromises that researchers and practitioners can expect to face when they attempt to affect real-world problems like energy-related behaviors.

The next five chapters—the problem oriented chapters—describe procedures for eliciting pro-environmental practices and review the successes and failures of experimental behavioral attempts to improve environmental quality. Chapter 3, discussing litter control, presents the Clean Community System (CCS) of Keep America Beautiful (KAB) as perhaps the most viable model for organizing large scale applications. The development, philosophy, and organization of CCS are described, and the reader is asked to view CCS and KAB as the way to involve entire communities in collaborative action. In the discussion of methods for reducing littering behavior and encouraging the removal of existing litter, particular emphasis is given to the photometric index as a reliable measure of the accumulation of litter.

In Chapter 4 on waste reduction and resource recovery, the authors contrast high-technology and low-technology strategies for waste management. They define waste reduction as the general reduction in consumption of resources and resource recovery as the extraction of resources from discarded materials. They argue again that applied behavior analysis can contribute substantially to the design and evaluation of community approaches to recycling. Low technology, low cost strategies such as incentives to encourage the use of returnable containers have provided models for community programs in waste reduction. The authors concede that the most heavily researched behavioral approaches still fall short of definitive proof of durability and applicability on a large scale.

Chapter 5 reviews research on behavioral strategies to promote conservation of residential energy. Fifty percent of the energy currently used in homes could be saved through low cost behavioral engineering and (counterintuitively) with relatively nonaversive changes in life styles. Antecedent strategies such as modelling, exhortations, and expectancy manipulations are contrasted to consequence procedures such as tax credits, rebates, and feedback on performance; and consequence procedures are judged to be relatively more effective. In addition to the specific behavioral aproaches to conservation, the authors give attention to the importance of interdisciplinary collaboration (e.g., more sophisticated development of economic modelling in behavioral work) to operate effectively at the level of the organization or community.

Chapter 6 addresses conservation in transportation, with particular emphasis on the passenger car and the impact of cars on environmental problems. The authors again play down physical-technical solutions in favor of strategies patterned to affect travel behaviors in the form of (a) lowering vehicular miles, (b) driving in a manner that will increse miles

per gallon, and (c) choosing energy efficient modes of travel such as mass transit, bicycles, car pools, and walking. In addition to change tactics evolved from behavioral analysis, the authors discuss the use of marketing, advertising, and economic principles.

The last of the problem oriented chapters, Chapter 7 (contributed by Robin Winkler), deals with water conservation and is conceptually similar to the preceding discussion of energy conservation. In the face of diminishing reserves of clean water, we have very limited options. Thus, the author elaborates on the option of conservation. The chapter focuses on residential consumption, the analysis of patterns of domestic consumption (i.e., demand management), and water resource management. After the review of research on water conservation, the chapter ends with a terse outline of the effective management of water.

Chapter 8 highlights the specific problem areas of the previous chapters and then offers the strong belief that changes in the conceptualizations, procedural strategies, and roles of the behavioral scientist will contribute a large share to effective, cost-efficient approaches to environmental preservation. The problems to be solved and the most appropriate approaches to change are seen as multidisciplinary and multifaceted. The authors end the book by outlinging some pragmatic steps for the behavioral scientist who has read the book and has been moved to ask, "How can I get involved?"

INTERNAL ISSUES

The three authors are widely known experts. Each is an ingenious and prolific researcher on environmentally related problems. Even though most of the studies described are available in other sources, the authors have made a significant contribution by compiling, organizing, juxtaposing, and evaluating several large bodies of research. They have shown that gathering up old wine into a new wineskin can make the wine more digestible. Independent of the important contribution of the book as a compendium, it also is worth reading for the following reasons alone: (a) for clearly demonstrating that policy makers and governmental agencies almost always favor tactics of change (prompts and punishments) that have the lowest rate of demonstrable effectiveness, (b) for demonstrating that traditional social values and the operational characteristics of transportation in our society strongly reinforce using cars at the expense of public transit, and (c) for scuttling common beliefs with some regularity (e.g., that significant conservation necessarily means lower quality of life).

If one focuses on the subtitle of the book (*New Strategies for Behavior Change*), then the book is a clear success. That is, an amazing array of new target problems, often in unusual and complex settings, now become part of the acceptable folklore of applied behavior analysis. A problem arises when one focuses on the major title (*Preserving the Environment*). Then the scope of the book seems limited because it never mentions several major environmental problems that must be dealt with in order to "preserve the environment." Significant examples are air pollution, dissipation of topsoil, noise, and toxic waste. Toxic waste represents a volatile and complex time bomb—one of the master problems of the environment. Furthermore, the book does not mention problems of increases in population. It may be argued that increasing population is *the* generic and pernicious environmental problem, denoting as it does an exploding increase in the number of persons who use the resources of the earth and despoil the earth by dumping back the byproducts of that use. It could be argued that solving the behavioral aspects of population control is the *only* effective long-term solution to the other environmental problems—that any other focus deals with symptoms rather than the underlying problem.

Much of the research that the authors summarize under the label of "antecedent strategies" (e.g., prompts) would be recognizable to social psychologists as work on persuasive communication (i.e.,

written or spoken messages, sometimes presented on films, designed to persuade a target audience to change behavior or attitudes). Research on persuasive communication has been voluminous, including a large body of behavioral work by the Yale laboratory (for example, the work of Hovland and colleagues). A great deal of progress has been made in determining influence as a function of properties of the message, mode of presentation, sender, recipient, timing, and larger context. Behavioral researchers in environmental areas seem to be cheating themselves and their audience by disregarding that large body of highly relevant work.

Two other problems also may be as disconcerting to other readers as they were to us. First, Chapter 2 is boring, difficult to read, and a bit dissonant with the rest of the book. Much of the review of principles of behavior analysis could have been deleted because the less formal descriptions used later in the book would have sufficed. In fact, the authors come very close to violating some of the basic tenets of radical behaviorism by attempting a taxonomy of controlling events based on their characteristics rather than their functions. The second problem is the fact that major portions of Chapter 8 do not follow from and have no identifiable relationship to the material in the major body of the text. For example, "A Comprehensive Approach," would appear on the face of it to be a culmination of the book, but is almost completely ad hoc.

A distillation of the authors' purposes for the book probably would first reduce to showing that "behaviors which contribute to environmental degradation and energy waste can be decreased on a large scale, and behaviors which preserve environmental resources and conserve energy can be increased on community-wide levels" (p. 16). In the narrow sense of the short term success of many demonstrations, the purpose is achieved, but even the authors admit that few tests of long-term durability or maintenance have been made. Second, they say that "This text was written not only to demonstrate the value of applied behavior analysis for environmental preservation, but to facilitate an appreciation for interdisciplinary problem solving among both the physical and behavioral sciences" (p. 15). As already indicated, the book achieves partial success on the first part (value of applied behavior analysis). However, it falls far short of achieving the second part, partly because of the lack of clear examples, but also because of the lack of a convincing conceptual argument.

OTHER ISSUES

At most points in the book, the authors see individuals as the primary target for change. We are often reminded that, for protection of the environment, *"People and their behavior make a dramatic difference!"* (p. 4), and the authors argue that the person focus represents first-order research and that changes at that level may influence second-order phenomena (larger systems) in positive ways. By emphasizing the individual approach, the authors seem to fall into the trap that Caplan and Nelson (1973) and Ryan (1971) misleadingly call blaming the victim. By focusing on individuals, we may (while remaining creative and productive) disregard other leverage points that might alleviate the problem more rapidly and on a larger scale. What makes such a mis-directed focus troublesome is that it often plays into the hands of vested interests who wish to avoid changing their practices and who now can avoid change precisely because of our work. For the authors to say that their approach "should not be construed as blaming people for our country's energy/environmental predicaments" (p. 11) misses the point and suggests a problem with the phrase, blaming the victim. The problem is not literally placing blame on the average citizen for getting us into environmental messes. The problem is misplaced focus for change—acting as if changing the average citizen's behavior is the most effective way to solve the environmental messes.

We also should note that applying contingency management to corporations, cities, agencies, and other collective enti-

ties is just plain hard—it is *easier* to apply the tactics to persons. We hope that this differential ease of application is not the primary reason for the popularity of the focus on persons and that experts in applied behavior analysis will deploy considerable effort to inventing tactics for larger collective units.

Probably most persons would agree that specific environmental problems (energy waste, pollution, water management) are symptoms of problems in much larger systems. In the case of energy, we agree with Stern and Gardner (1981) when they say that

> . . . most of the research has concentrated on actions with limited potential for alleviating energy problems, while actions with much greater potential have been neglected.
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> . . . both the theoretical weakness and the failure to focus on the most important behaviors stem from psychologists' general unfamiliarity with energy systems. We believe that if psychology is to advance energy-related theory or to make practical contributions to energy policy, the effort must begin with a behaviorally oriented analysis of the national energy system (p. 331).

An analogy might help. Tapp (1980) points out that when psychologists become involved in the legal system, they tend to focus on phenomena that occur in courtrooms; e.g., expert testimony, credibility of witnesses, behavior in juries. However, since only 8% of cases in the legal system ever go to court, psychologists are not affecting much of the variance in the legal system.

Similarly, Stern and Gardner argue, psychologists tend to focus on personal and household use of energy, and they tend to focus on energy use that relates to repetitive behaviors, the kinds of behavior that can be counted for baseline frequencies and placed on schedules of manipulation over time. Part of the problem is that heating and air conditioning in households account for only about 10-11% of energy consumption in our society. So affecting that sector by a little bit with a behavior shaping program does little to affect the overall variance of consumption in the energy system. The second part of the problem is that repetitive behaviors (changing thermostats, flipping switches) control somewhat lower percentages of energy consumption than one-time behaviors; e.g., buying a gas-efficient car, insulating a house. Thus, psychologists have chosen target phenomena that will affect relatively small overall amounts of energy consumption. The way to rectify this problem is to become acquainted with the descriptive characteristics of the entire energy producing and consuming system.

The final issue we wish to raise is the importance of ecosystems or ecobehavioral systems. The authors allude to this issue a number of times, but they never make the case convincingly for its relevance to their work. In fact, they say that "The authors of this book, like most behavioral scientists, are experts in first-order change, but not in second-order or system change" (p. 9). The one part of the book that comes closest to an effective treatment of larger contexts and ecosystems is Winkler's guest contribution on water conservation. We will mention several specific benefits of the ecosystem perspective and some more general issues.

As indicated by Stern and Gardner, the systems viewpoint and some basic data on distributions within a system can provide important perspectives and evaluation for a particular body of work. However, the ecosystem view also brings with it the awareness and understanding of complex and unintended effects. One of the significant features of many social, physical, and biological systems is that they function as integrated wholes; manipulation of any part of such a system will affect each of the other parts and change the whole. Even the most positively motivated intrusions into these systems can lead to all sorts of unanticipated effects, some of which may be unpleasant and pernicious.

Psychologists often believe that their favorite approaches to research ultimately will yield comprehensive understanding of human behavior. We believe they are wrong in many cases because their conception of the research problems is too narrow and too simplistic. In seeking to alleviate problems, practitioners often believe that in order to be successful they

need mainly to do more of what they are already doing and to do it more intensely. Again, we believe they often are wrong, and we believe that many of their best efforts will suffer because they do not understand the size and the complexity of the systems in which they are dabbling. By now, there is a great deal of evidence to support these cautionary comments about ecosystems, both from nonbehavioral areas (e.g., pesticides) and behavioral areas (Willems, 1974, 1977, in press; Willems & Stuart, 1980). The challenge is to gain enough understanding of systems so that complex effects of interventions can be anticipated and weighed before the fact in cost/benefit analyses.

Another facet of the perspective of ecosystems is that we tend to operate as single-level experts in a multi-level world. As scientists and practitioners, we often accept the doctrine of the organization of the world in terms of levels. Then, we become very precise at working *within* a level. Having picked the level of analysis that clusters very tightly around the person and behavior, psychologists stick to that level, work within it and not with it. That is, they do little to display its relations to the environment as it extends away from the person, spatially and temporally. But this commitment to one level may fail to be heuristic; what is more, it may actually become *anti-heuristic* and dysfunctional if it blinds us to phenomena that cut across levels.

What is more, the interdependencies that tie levels to each other often produce conditions under which the larger context affects the degree of success or failure of interventions at lower, more embedded, levels. For example, Wahler (1980) and Wahler, Berland, Coe and Leske (1977) describe a program of parent training to treat oppositional and disturbed children. The program generally was successful during the time it was applied, but the durability of the effects during follow-up was mixed. To make a long story short, the clinician-investigators found maintenance to be very low among insular families, families whose parents (primarily mothers) had few community contacts (friendships, etc.) and who had mainly aversive contacts when they did occur. At times, our targets of intervention and our degree of success and failure are affected by the larger contexts in which they are embedded.

At a more general level, we believe that we as psychologists must learn to account more effectively for the ways in which human behavior—human action—is intertwined as an equal partner in ecosystems. That problem represents the largest piece of unfinished business in ecological science. Human behavior, its functions, its cycles, its interdepencies, its roles as cause and effect, and its contributions to positive and negative outcomes are just as real and just as palpable as the functions of the other factors. The authors of *Preserving the Environment* certainly allude to this issue, but do not give it enough conceptual elaboration or detail. In fact, if we do not progress to that level of analysis, then we will continue to produce spare-parts catalogues and yet never get the machine to run without destructive results. In ecosystems, human action affects system events, but is altered, magnified, intensified, and made more grotesque.

We also believe that we should become much more sophisticated at the skills of forecasting and diagnosing the problems of ecosystems and that we need to train forecasters and diagnosticians. This is partly a nonscientific matter because forecasting and diagnosis cannot be taught by scientific formulae. Formal, scientific activities will contribute a great deal to those important functions, but the scientific activities by themselves will not assure astute and effective forecasts and diagnoses, which involve a great deal of aggregation, accumulation, sifting, weighing, wisdom, judgment, and good sense. In fact, this may come to be especially true in the case of ecosystems because the basic ingredients come from so many disparate disciplines.

Finally, we agree with the authors when they argue that most of us in psychology need to become more comfortable with new and strange conceptualizations and methods, among which are the following: (a) Persons and environments must be

viewed and studied at levels of complexity that are quite atypical in behavioral science. (b) The complexity lies in systems of relationships that link persons, behavior, social environment, and physical environment. (c) Such systems cannot be understood piecemeal. (d) Such systems have important properties that change, unfold, and become clear only over long periods of time. (e) Tampering with any part of such a system will affect the other parts and alter the whole. (f) We must develop system-level awareness of the many ways in which simple intrusions and changes can produce unintended effects, indirect harm may follow from narrowly-defined good, and long-term harm may follow short-term good. (g) The focal challenge is to achieve enough understanding of such systems so that the effects of interventions and planned changes can be anticipated in comprehensive fashion. (h) The phenomena most troubling and most important to the welfare of human beings range far across the arbitrary boundaries of the disciplines we now hold so dear.

We recognize that these are complicated and demanding expectations, and we agree with the authors of *Preserving the Environment* when they point out that "old habits die hard, and institutions are more apt to remain the same than change" (p. 269). However, the authors, together with Cone and Hayes (1980) and others, already have taken some giant steps toward eroding old, restricting assumptions and foundations. That is an important function, and it probably is fitting that applied behavior analysts (and relatively young ones at that) would lead psychology, kicking and screaming, into dealing with large scale problems that are unique to the late 20th century.

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